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मानक

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IS 3251-2 (1992): Specification for Asphalt paver finisher  
- General requirements, Part 2: Hydraulic [MED 18:  
Construction Plant and Machinery]



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एसफाल्ट पेवर फिनिशर — सामान्य अपेक्षाएं

भाग 2 द्रवचालित

( पहला पुनरीक्षण )

*Indian Standard*

**ASPHALT PAVER FINISHER — GENERAL  
REQUIREMENTS**

**PART 2 HYDRAULIC**

*( First Revision )*

UDC 625-85-089

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**BUREAU OF INDIAN STANDARDS  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002**

## **FOREWORD**

This Indian Standard ( First Revision ) was adopted by the Bureau of Indian Standards, after the draft finalized by the Construction Plant and Machinery Sectional Committee had been approved by the Heavy Mechanical Engineering Division Council.

Rapid increase in volume of traffic, heavier axle loads and better riding quality, demand for improved road surfacings. This has necessitated improvements in the techniques of construction of bitumen roads. Mechanization is playing an ever increasing role in the production and laying of high quality bituminous mixes.

This standard was first published in 1965. This revision is made in view of the experience gained during the use of this standard. The clauses with regard to capacity, mounting, feeding conveyor, performance, etc have been modified.

*Indian Standard***ASPHALT PAVER FINISHER — GENERAL REQUIREMENTS****PART 2 HYDRAULIC***( First Revision )***1 SCOPE**

1.1 This standard lays down the requirements regarding materials, construction, capacity and performance of asphalt paver finishers (hydraulic).

**2 TYPE**

2.1 For the purpose of defining capacity and rating the pavers can be classified in two types as Type A and Type B.

**3 MATERIALS**

3.1 Materials used in construction of asphalt paver finisher and the power unit shall comply with the requirements of relevant Indian Standards.

**4 CAPACITY AND RATING**

4.1 The capacity and rating for two types of paver shall be as given below.

	<i>Type A</i>	<i>Type B</i>
1. Maximum paving thickness	200 mm	250 mm
2. Paving width		
a) with basic screed (Hydraulically extendable)	2.0 to 4.0 m	2.5 to 5.5 m
b) with extensions	Up to 4.5 m	Up to 7.5 m
c) with cut off shoes	1.8 m	2.0 m
3. Maximum paving rate	150 t/h	250 t/h
4. Engine rated output (minimum)	44 kW	74 kW

**5 TRANSMISSION**

5.1 Transmission shall be fully hydrostatic capable of providing variable paving and travel speed and differential locking arrangements.

**6 MOUNTING**

6.1 The paver finisher may be mounted on wheels or tracks.

6.2 If the paver finisher is mounted on wheels, the front tyres shall be four in number and shall be of solid rubber type. Hydraulic steering arrangement shall be provided.

6.3 If the paver finisher is mounted on crawlers the crawler shall be independently operated to furnish full steering control. Crawlers shall be provided with a spring tension track tightener and all rollers, sprockets and idlers shall be designed with an adequate means for lubrication. The bearing pressure of the crawler assembly when the paver finisher is empty shall not be greater than 10 N/mm<sup>2</sup>. The bearing pressure of crawler assembly under loaded condition shall not be greater than 17 N/mm<sup>2</sup>.

**6.3.1 Three Point Crawler Suspension**

Three point crawler suspension shall be provided which allows position contact of crawler shoes and positive traction on undulated terrain like access road to paving areas. This will reduce strain to the tractor frame on corrugated surface.

6.4 If the paver finisher is mounted on wheels, the front wheels shall be with hydrostatic steering and the main drive wheels shall be controlled through a differential drive. The recommended tyre pressure for pneumatic tyres shall be clearly indicated on the machine.

6.5 Whether mounted on wheels or tracks, sufficient traction shall be provided by the crawlers or pneumatic tyres, when working on a firm unyielding base, to push up a 10 percent grade, a fully loaded truck of 10 t.

**7 PUSHING ROLLERS**

7.1 The front end of the main frame of the paver finishers shall be equipped with two

rollers with adjustable height and oscillation properly spaced to contact the rear wheels or the material feeding truck when feeding premixed material into the paver finisher.

## 8 RECEIVING HOPPER AND FEEDING CONVEYOR

**8.1** The paver finisher shall be provided with a steel hopper to receive material direct from trucks. The hopper for the paver finisher shall have two bar type conveyors with variable hydrostatic drive independent of traction transmission, and also capable of being operated individually.

**8.1.1** The floor of the hopper shall be constructed of abrasion resistant steel plate having a minimum thickness of 6 mm.

**8.1.2** The minimum capacity of the hopper shall be as follows:

<i>Screed Width with Extension</i>	<i>Minimum Capacity</i>
Up to 2.5 m	8 t
3 m and above	12 t

**8.1.3** The sides of the hopper shall consist of wings so arranged that each hopper wing may be individually raised or lowered by hydraulic ram to a position within the paver's overall width for travel or to avoid accumulation of material in the corners of the hopper.

**8.2** The conveyor shall move the premixed material to the spreading screws, the volume of material moved being controlled by means of adjustable gates. Feed control limit switches shall be provided at the screed which automatically switches 'on' or 'off' the conveyors and augers on either side independently, to assure the even flow of material to the screed so that surging or waiting for material shall be avoided.

## 9 SPREADING AUGERS

**9.1** The paver finisher shall be provided with two spreading augers having independent drives which may be extended hydraulically and capable of evenly distributing the material delivered by the bar type conveyor over the whole or either half of the width of the area to be surfaced. One auger shall have a right hand thread and the other a left hand thread, each moving the material from the centre to the side.

**9.2** The auger conveyor shall have removable anti-abrasion tips.

**9.3** Limit switches shall be provided at the auger ends of the screed which sense the presence of material and automatically start or stop the auger conveyor individually.

**9.4** The spreading augers shall be operated hydraulically.

**9.5** The height of the auger conveyor shall be adjustable.

## 10 SCREED

### 10.1 Compaction

The paver finisher shall be provided with a device for obtaining preliminary compaction of the material by either of the method described in 10.1.1 and 10.1.2. Compaction may be effected either by means of tamping device a head of the screed or by vibration applied to the screed or combination of the both.

#### 10.1.1 Tamper

If compaction is obtained by means of tamper, the tamper shall operate at the rate of not less than 1 500 strokes/min. The vertical strokes may be about 5 mm. The wearing parts of the tamper shall be manganese steel or equally wear resisting alloy steel and shall be renewable and adjustable to the optimum projection below the screed. The tamping action shall leave the material in proper condition for smoothing and finishing by the screed. The tamper shall be operated hydraulically.

#### 10.1.2 Vibrating Screed

If compaction is obtained by means of a vibrating screed, the intensity of vibration shall be capable of being controlled through a range of 0 to 3 000 vibrations/min so that the optimum intensity in relation to mat thickness density, working speed and material specification may be employed.

**10.2** The paver finisher shall be equipped with a fully floating, heated screed. The screed shall slide over the compacted mat and smooth it out in preparation for rolling and shall be adjustable to give a crown of -1 to +3 percent to the compacted mat.

**10.3** The screed shall be hydraulically extendable so that the width of the mat is infinitely variable between that minimum and maximum specified width. The telescopic system shall preferably have separate guide cylinders to increase the stability of the adjustable screeds. Extension of screed also have either of the

arrangement for compaction such as tamper, vibration or both.

**10.4** The screed shall be equipped with diesel propane LPG/electric heating system which will enable the screed to be uniformly heated before and during the operation of the paver finisher. An electronic safety-ignition system coupled with a thermostat shall be provided.

**10.5** The screed shall be constructed from abrasion resisting steel and the wearing parts shall be renewable.

**10.6** The screed and the tamper, if employed, shall be so carried and drawn over the material that it will maintain a predetermined average thickness which will not be affected by sudden or minor changes in the level of the base on which the material is being applied.

**10.7** The screed shall be equipped with turn buckle screws for adjusting the angle of attack. The height of tow points to which the side arms are attached shall be hydraulically adjustable to enable the changes in the angle of attack during operation.

**10.8** Means shall be provided for raising the screed and the tamper if employed, by a power operated hydraulic ram or similar device to a traveling position clear of the road surface. Locks or safety chains shall be provided for holding the screed in the raised position while the paver finisher is being moved from one working point to another.

**10.9** Minimum paving speed shall vary from 0 to 15 m/min for crawler paver and 0 to 30m/min for wheeled paver.

## **11 OPTIONAL EQUIPMENT**

### **11.1 Automatic Screed Controller**

Automatic screed controller shall be provided as a standard option with the pavers consisting of slope sensor, grade sensor and the related system.

#### **11.1.1 Grade Controller**

This controller detects the level in the traveling direction and maintains surface smoothness.

#### **11.1.2 Slope Controller**

This controller detects the slope in the transverse direction and maintain the cross slope at the preset level. Setting can be made to a desired level.

### **11.1.3 Leveling Cylinder**

This cylinder automatically moves up and down in accordance with electrical signals sent from the controllers, changes the attack angle of the screed and maintains the thickness and cross slope of pavement at a fixed level.

### **11.1.4 Mobile Reference or Averaging Beam**

This can also be used with sensor. This beam is towed along the side of the machine and by averaging out the undulation on the surface over which it travels allows the sensor to maintain long uniform longitudinal profile. Beams takes several forms: a long skid with a length of 9-14 m or more, which averages over the high spots; wheeled models which follow all undulation; or one with random placement of sledges.

## **11.2 Automatic 'Pave' Control**

The screed may be locked in its position and the tamper vibrator drives are automatically shut off when the finisher stops moving ( traction level in neutral ).

## **11.3 Dual Controls**

Dual controls shall be provided as an option so that the paver may be operated from each side of the machine. This may be achieved with a set of readily relocatable master panel and driver's seat.

## **11.4 Wide Crawler Shoes**

Wide crawler shoes shall be offered as an option which reduces the ground contact pressure eliminating the damage to the unstable sub-grade or sub-base course.

## **11.5 Rubber Pads for Crawler**

Rubber pads for crawler shall be offered as an option for crawler shoes, which ensures positive traction on steep hill climb job. This will avoid damages to the finished pavement surface when the paver has to travel on the pavement.

## **12 CONTROL CONSOLE**

**12.1** Engine, tachometer, speedometer, water temperature gauge, fuel level gauge, hour meter and other warning lamps on the instrument panel shall be of first quality design. Single control console for power steering, finger tip top control for hopper, feeders, screws, flow-gates, screed hoist, tamper vibration, speed, differential lock, forward or reverse travel,



automatic level and grade control, etc needed for all operations of paver.

### 13 CONSTRUCTION

**13.1** The drives from the engine to crawlers or driving wheels hopper conveyors, screw spreaders, etc shall be of first quality design in accordance with best engineering practice. Gears and sprockets shall be machine cut and properly hardened. Clutches and brakes shall be of simple design, of ample capacity and shall be accessible for quick adjustment.

#### 13.2 Workmanship

All parts, components and assemblies of the paver finisher including, castings, forgings, moulded parts, stampings, bearings, seals, machines surfaces and welded parts shall be clean and free from sand, dirt, fins, pits, sprues scale, flux and other harmful extraneous material. All exposed edges shall be rounded or beveled.

### 14 METHOD OF TRANSPORTING

**14.1** The maximum traveling speed of the paver shall not be less than 10 km/h for wheeled maximum and 4 km/h for crawler paver.

### 15 PERFORMANCE

**15.1** The paver finisher shall lay, compact and finish a mat of asphaltic material of thickness and widths specified in 4.1. The compacted mat shall be free from tearing and dragging and the surface shall be smooth laterally and longitudinally. The limits of tolerances for surface irregularity on bituminous surfacings laid by a paver finisher is given below:

Type of Surfacing	Longitudinal Profile ( mm*)	Cross Profile ( mm** )
Bituminous mecadum	10	6
Semidense asphaltic concrete	10	6
Asphaltic concrete	8	4

### 16 MAINTENANCE ACCESSIBILITY

#### 16.1 Ease of Maintenance

All major assemblies and installed attachments shall be accessible for maintenance, repair,

and replacement, without the removal of other major assemblies and installed attachments. Covers and plates which shall be removed for component adjustments, replacements and maintenance shall be equipped with quick-disconnect fasteners.

### 17 LUBRICATION

**17.1** Means for lubrication shall be provided for all bearings, power transmitting gears, sprocket, chains and all other parts requiring lubrication. Plain bearings on their shafts shall have oil or grease grooves. All lubricating nipples shall be of similar type and shall be readily accessible. Where access for lubrication is difficult, bearing shall be such that lubrication is required as infrequently as possible or facilities for lubrication from a remote position shall be provided. A lubrication chart indicating the points to be lubricated shall be permanently affixed in a conspicuous place on the machine describing the type of lubricant, the interval of greasing and the amount to be used. Chains shall be enclosed and provided with oil bath or drip feed lubrication.

**17.2** Automatic pressure release devices shall be provided where pressure lubricating equipment may damage grease seals or other parts.

### 18 SAFETY REQUIREMENTS

**18.1** All exposed parts which are subject to high operating temperatures or which are energised electrically shall be insulated, fully enclosed or guarded. All moving parts which are of such nature or so located as to be a hazard to operating or maintenance persosnnel shall be fully enclosed or guarded. Protective devices shall not impair the operating functions.

**18.2** Effective precautions shall be taken to minimize fire hazard.

### 19 FINISHING

**19.1** All exposed parts of the paver finisher shall be cleaned, treated and painted with suitable anti-corrosive protective paint conforming to the relevant Indian Standards. Electric equipment, power units and parts subjected to high temperature shall be painted with special paint suited for the purpose.

### 20 MAINTENANCE TOOLS AND ACCESSORIES

**20.1** A strong tool box with lock and key and containing necessary tools and accessories for

\*Measured with a 3m straight edge.

\*\*Measured under a camber template.

normal maintenance, adjustment and lubrication of the paver finisher together with instruction and inventory of tools and accessories shall be provided. Provisions shall be made for suitably affixing the tool box on the paver finisher.

## 21 MARKING

### 21.1 Instruction Plates

The paver finisher shall be equipped with instruction plates including warnings and cautions, suitably located, describing any special for important procedure to be followed in operating and servicing the machine.

### 21.2 Marking Plate

The paver finisher shall have an identification plate permanently affixed to it with the following particulars conspicuously marked on it:

- a) Manufacturer's name or trade-mark,
- b) Manufacturer's reference no,
- c) Capacity ( see 4.1 ),
- d) Type and rating of power unit, and
- e) Year of manufacture.

21.3 The following information shall be provided by the manufacturer:

#### a) Dimensions

- 1) Overall length, mm;
- 2) Overall width, mm;
- 3) Overall height, mm;
- 4) Gross weight, kg ( approx );
- 5) Distance between track centre, mm;
- 6) Track length on ground, mm;
- 7) Track shoe width, mm;

- 8) Hopper width, mm;
- 9) Hopper capacity, kg;
- 10) Screed plate width, mm; and
- 11) Screed plate length, mm.

#### b) Engine

- 1) Model;
- 2) Rated speed, rev/min; and
- 3) Rated output, kW.

#### c) Performance

- 1) Paving width, m;
- 2) Paving thickness, mm;
- 3) Crown, percentage;
- 4) Paving speed, m/min;
- 5) Maximum paving rate t/h;
- 6) Traveling speeds kmph;
- 7) Minimum turning radius, m;
- 8) Vibrator revolutions, vibrations/min;
- 9) Tamper frequency, strokes/min;
- 10) Tamper stroke, mm; and
- 11) Screed heater.

#### d) Optional Equipments

- 1) Automatic screed controller,
- 2) Automatic pavn controller,
- 3) Dual controls,
- 4) Crawler rubber pad, and
- 5) Wider crawler shoes.

#### e) Accessories

- 1) List of tools, and
- 2) Special accessories, if any.

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